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by the use of sulphur, applied as the flowers of sulphur, dusted on the leaves by means of a bellows, or even, as Mr. Kanetkar suggests, shaken through a muslin bag. Persistently applied, this has given good results at Poona. It is a routine practice in many parts of France, where it is looked on as much a part of the ordinary vineyard cultivation as weeding or pruning, and owing to this treatment over a large area, the disease has ceased to be very serious in Europe. *Karpa rog* is equally well known in Europe under the name of "anthracnose," being caused by the fungus *Sphaceloma ampelinum*. The young branches are attacked by brown patches, which eat into the bark ; as a result they dry up and blacken, as if burnt. The fruit is also frequently attacked and spoiled, and in bad cases the vines eventually die. In the treatment of this disease, sulphur may also be employed with good results at the beginning of an attack. The best remedy is, however, swabbing all the diseased branches with a rag brush dipped into a solution of iron sulphate and sulphuric acid, of a strength of fifty parts of iron sulphate, one part of sulphuric acid and one hundred parts of water.—(E. J. Butler.)

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Spraying Potatoes.—Experiments carried out in Shillong this year, by the Eastern Bengal and Assam Department of Agriculture, yielded good results. The experiments were in duplicate, each including four plots which were treated alike, except in regard to the spraying. One of the four plots was sprayed three times during the growing season with plain Bordeaux mixture, the second with Bordeaux mixture to which a small quantity of rosin and soda solution was added to make it adhesive, the third with Bordeaux mixture to which *gur* was added with the same view, and the fourth was left unsprayed. It has been found that the excessive rain during the growing season in the Khasi Hills makes it difficult to get the mixture to adhere to the foliage, without the addition of some adhesive substance. The quantity of Bordeaux mixture used in the first three plots was 300 gallons per acre, *viz.*, 60 gallons at the first application, and 120 at each of the others.

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The yield per acre and cost of the treatment of the different plots were as below:—

	First series.	Second series.	Average of two series.	Excess of yield due to spraying.	Value of excess yield at Rs. 1-4-0 per maund.	Cost of spraying.	Profit due to spraying.
1	2	3	4	5	6	7	8
	Mds.	Mds.	Mds.	Mds.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Plain Bordeaux mixture.	144	133	138½	50	62 8 0	12 9 6	49 14 6
Bordeaux mixture with rosin and soda.	147	158	152½	64	80 0 0	19 10 0	60 6 0
Bordeaux mixture with *gur*.	125	158	141½	53	66 4 0	15 3 9	51 0 3
Unsprayed ...	106	71	88½	...	...	.....	...

The sprayed plots show a substantial profit.—(E. J. Butler.)

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PROTECTIVE WIND BELTS.—The Director of Agriculture and Government Botanist, Federated Malay States, has carried out experiments which indicate the value of protective wind belts in checking the spread of disease, in the case of crops which cover a large area continuously. Some experiments with jute hessian screens, made previously on Ceylon tea estates, showed clearly the value of a mechanical protection from the attacks of wind-borne spores. The screens were erected at right angles to the prevailing winds, and the appearance of leaf fungi, to leeward and to windward respectively, carefully observed. The bushes to leeward were much less affected than those to windward. In the Malay Peninsula these experiments are being put to practical test in the rubber-planting districts, so that these may be as far as possible divided off by belts of jungle, in such a manner that the outbreak of disease in one locality may be confined within limits, and plantations in other parts may either be preserved from the evil, or at any rate protected for a time. In temperate climates the spread of fungus pests is checked by the advent of winter, but in tropical countries the climatic conditions are often such as to afford almost perfect conditions for the spread of disease all the

year round. That many crops are not entirely destroyed by parasitic disease is due to the fact that most crops are grown in patches with often considerable gaps between one field and the next, and the intervention of other crops which are not liable to the same disease. Anything which may tend to produce the same conditions with crops, such as tea, coffee, rubber, cinchona and the like, should exercise a certain amount of check on the spread of wind-borne diseases.—(E. J. Butler.)

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MULBERRY DISEASE IN KASHMIR.—The State mulberry plantations near Srinagar were this year seriously attacked by a disease, which has not previously been recorded in India. It is said to have occurred before in former years, but has never been described, nor the cause of it determined. This year it was worse than hitherto, possibly owing to the unusally severe winter of 1905-6 in Kashmir. The disease is found in old trees without causing appreciable damage; but it does great harm to the young plants in the nurseries, attacking the seedlings in their second or subsequent years. It does not kill them outright, but they have to be cut back below the diseased parts, thus losing several years' growth even if they are not attacked again. The disease is caused by a parasitic fungus (*Coryneum mori*), which invades the wood or the branches and comes to the surface to form spores. The latter are produced in little black, broken patches visible on the bark. The result is the withering of the young branches, which drop their leaves. The parasite has previously only been found in Japan, where it was first described in 1904, and it is an interesting problem how it has come to occur in these two countries without having been observed elsewhere. We know nothing of the parasitic fungi of the countries intervening between India and Japan, such as China, Burma and the neighbouring countries, and it is possible that the fungus is found continuously on the various species of mulberry which occur in these regions, either cultivated or wild. In this case it may have spread either from India to Japan, or from Japan to India. A more likely explanation, however, is that it has been introduced into India from Japan, during some of the

attempts which have been made to apply Japanese methods in the silk industry of India. How serious the disease is likely to prove it is not yet possible to predict, nor whether it can be easily controlled. It seems clear that much may be done to lessen its attacks by pruning off all diseased parts and burning them. It is to be hoped that the Kashmir Durbar will be able to secure a thorough investigation of this new pest, and adopt measures to stamp it out and prevent its spread into India proper.—(E. J. Butler.)

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THE MIXTURE OF WHEAT VARIETIES IN INDIA.—In a previous note (Vol. 1, p. 401), the possibility that wheat seed, left on the ground at reaping time, escaped germination during the summer and formed part of the next crop, was discussed. It was mentioned that this might take place in districts like the irrigated wheat tracts of the Punjab, where the summer temperature is so high and the rainfall during the monsoon so small. During November last, some observations were made on this point at the Lyallpur experiment station and in the neighbourhood. In both barley and oat fields, as well as those under wheat last year, seedlings of these cereals were found often in abundance at sowing time. Many of these would no doubt be destroyed in the final operations of ploughing and sowing, but a few might easily survive and thus lead to admixture of types in case a different variety of wheat was sown on the land for the succeeding crop.

The ants, which are so busy at harvest-time, burying stray wheat grains, are also active at sowing time. They remove from the surface any seeds left by the hanger and carry them some distance. It is quite possible, therefore, for some slight admixture to take place by this means between two different varieties sown in adjoining plots, even though each of the varieties was sown absolutely pure.

These difficulties, of course, mostly concern those engaged in testing different varieties of crops of this nature. They are interesting in view of the fact that statements are sometimes made as to the change of type of one wheat into something quite different.

Before such statements can be accepted, it is obvious that the possibility of errors such as these creeping into the work must be excluded.—(A. Howard.)

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VOLUNTEER WHEAT AND RUST.—In some countries the outbreak of rust in wheat is ascribed to the carrying over of the parasite, in its living infective state, on "volunteer" wheat, *i.e.*, self-sown wheat which grows in the interval between two crops. In the United States, for instance, such wheat may be found all the year round, and fresh rust spores have been gathered and germinated almost every month of the year. In the plains of India self-sown wheat is very rare in the hot weather, and after the crop is cut, no plants can usually be found until the next crop is sown. Some experiments have been made at the Cawnpore Agricultural Station by Mr. J. M. Hayman, to endeavour to raise wheat plants in the hot weather and rains, with a view to ascertain whether rust can be carried over on them to the new season's crop. The results confirm the opinion that rust is not propagated in this way in Northern India. Plants, sown early in the hot weather, feebly headed out towards the end of July, but produced no seed. They showed that two generations at least would be required to carry wheat over the gap between two seasons. No trace of rust was found, though the wheat grown was an extremely susceptible one. Hence, even if feeble plants struggle through the hot weather, it is unlikely that they can become infected with rust. It has previously been proved in India that the rust spores cannot survive exposure to such heat as is experienced in the hot weather months. To explain the annual appearance of rust in India through the medium of volunteer wheat, it is necessary to assume a combination of favourable conditions greater than the imagination can easily accept. The seed would have to be cast in a shady locality; it would have to escape squirrels and other pests, which at Cawnpore ate all that was not specially enclosed; it would have to mature its grain, re-sow it and produce a second generation in the rains; and all this time it would have to be exposed, at frequent intervals, to infection from spores which themselves are very susceptible

to heat, and would have to be protected from it by lying under leaves or soil until some cause brings them in contact with the wheat. Even after contact, infection would not occur in the absence of moisture, and moisture on the leaves of plants is rare in the hot weather. The problem of the transmission of rust from season to season is still far from being solved.—(E. J. Butler.)